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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,727	04/02/2004	John D. Brennan	3244-127	9476

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EXAMINER	
HAQ, SHAFIQUL	
ART UNIT	PAPER NUMBER
1641	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/815,727	BRENNAN ET AL.	
	Examiner	Art Unit	
	Shafiqul Haq	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 September 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-14 and 16-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-14 and 16-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/26/07 has been entered.

2. Claims 1, 3-14 and 16-25 are pending in this application.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 3-14 and 16-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 1 recites the terms "non-hydrolysed and non-polycondensed polyol silane". The terms "non-hydrolysed polyol silane" and "non-polycondensed polyol silane" are not clearly defined in the specification and thus it is unclear what compounds are encompassed by "non-hydrolysed polyol silane" and "non-polycondensed polyol silane". It is also not clear what is intended to mean by "non-polycondensed polyol silane". It is not clear whether Dextran, oligopolysaccharides or plysaccharides,

which are polymers derived from condensation (polymerization) of many monomers, are considered as non-polycondensed organic polyol?

6. With regard to claim 1 it is confusing as well as unclear what compounds of formula I are included in the definition of "one or more additives" that cause phase separation to occur because "additives" are defined in the specification by various water soluble, hydrophobic, neutral, and various polymers that are structurally and functionally distinct. Specification, lines 1-30 of page 15, includes a large number of water soluble compounds in the definition of "additives" which does not include the compound of formula I. Page 20 (lines 10-23) of the specification further defines additives by one or more of humectants or other stabilizing agents (for e.g. osmolytes). Such additives include, for example, one or more of organic polyols, hydrophilic, hydrophobic, neutral or charged organic polymers, block or random co-polymers, polyelectrolytes, sugars (natural or synthetic), and amino acids (natural and synthetic). In embodiments of the invention, the one or more additives are selected from one or more of glycerol, sorbitol, sarcosine and polyethylene glycol (PEG). In further embodiments, the additive is glycerol. Therefore, it is unclear as well as confusing as to what compounds are encompassed by the term "one of more additives", which cause phase separation to occur before gelation of the precursor.

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1, 3-14 and 16-25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement (New matter). The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The newly added phrase "the protein- and membrane compatible sol-gel precursor consists essentially of a non-hydrolysed and non-polycondensed organic polyol saline" to claim 1 does not have support in the specification.

Lines 26-30, page 21 of specification recites the following:

> "The liposome-molecule assembly may be combined with a protein- or membrane-compatible, sol-gel precursor solution under conditions which allow a gel to form. By "gel" it is meant a solution or "sol" that has lost flow. The sols lose flow due to the hydrolysis and polycondensation of the precursor. The hydrolysis and condensation of the polyol silane and sodium silicate precursors may suitably be carried out in aqueous solution."

The above lines in the specification disclose that sol gel formation requires hydrolysis and polycondensation of the precursor but however, the above disclosure does not necessarily mean that the protein and the membrane-compatible sol-gel precursor consists essentially of a non-hydrolysed and non-polycondensed organic polyol silane.

Lines 8-13 of page 14 recites the following:

> "The organic polyol silane precursor is prepared by reacting an alkoxysilane, for example tetraethoxysilane (TEOS) or tetramethoxysilane (TMOS), with an organic polyol. In an embodiment, the organic polyol is selected from sugar alcohols, sugar acids, saccharides, oligosaccharides and polysaccharides. Simple saccharides are also known as carbohydrates or sugars. Carbohydrates may be defined as polyhydroxy aldehydes or ketones or **substances that hydroylze** to yield such compounds."

Lines 19-30 of page 14 recites the following:

> "The organic polyol may also be a disaccharide, for example, one or more of, sucrose, maltose, cellobiose and lactose. Polyols also include polysaccharides, for example one or more of dextran, (500-50,000 MW), amylose and pectin. In embodiments of the invention the organic polyol is selected from one or more of glycerol, sorbitol, maltose, trehelose, glucose, sucrose, amylose, pectin, lactose, fructose, dextrose and dextran and the like. In 25 embodiments of the present invention, the organic polyol is selected from glycerol, sorbitol, maltose and dextran. Some representative examples of the resulting polyol silane precursors suitable for use in the methods of the invention include one or more of diglycerylsilane (DGS), monosorbitylsilane (MSS), monomaltosylsilane (MMS), dimaltosylsilane (DMS) or dextran-based silane (DS). In embodiments, the polyol silane 30 precursor is selected from one or more of DGS and MSS."

The above lines disclose that organic polyol silane precursor is prepared by reacting an alkoxysilane with organic polyols such as carbohydrates wherein carbohydrates are defined as polydydroxy aldehydes or ketones or subatances that hydrolyze to yield such compounds. Therefore, specification discloses that organic polyol silane may include hydrolysed product and thus is contrary to claimed method involving "non-hydrolysed and non-polycondensed polyol silane".

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1,148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

    1. Determining the scope and contents of the prior art.
    2. Ascertaining the differences between the prior art and the claims at issue.
    3. Resolving the level of ordinary skill in the pertinent art.
    4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 1-9, 11 and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gill (Chem. Mater., Web Release Date of July 4, 2001, Vol. 13, pp3404-3421) in view of Gill et al. (J. Am. Chem. Soc., 1998, Vol. 120, pp8587-8598) and Stowell et al. (U.S. Patent No. 6,284,163, Sep. 4, 2001).

    Gill teaches a method of immobilizing membrane-associated molecules in silica matrixes comprising combining biomolecular structures (p3405, General

Considerations for the Encapsulation of Biomolecular Structures), with a protein- and membrane-compatible sol-gel Precursor under conditions to allow a gel to form (pp3404, Abstract), wherein the protein- and membrane-compatible sol-gel precursor is an organic polyol silane (alkoxy-silanes mixed with an organic polyol such as glycerol, pp3406-8. Gill also teaches a method of combining the biological structures and sol-gel precursor in the presence of one or more additives such as polyethylene glycol (p3407, Figure 1). With respect to the limitation of "non-hydrolysed and non-polycondensed organic polyol silane," current specification discloses DGS prepared by a method disclosed in the Provisional Application No. 60/384,084 (p30, lines 1-2), which discloses that DGS is prepared by mixing of alkoxysilane with organic polyol such as glycerol (pp9-10). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to recognize that the method of Gill, which involves mixing of alkoxysilane with glycerol would result in DGS (i.e. a non-hydrolysed and non-polycondensed organic polyol silane). The Essentials of Sol-Gel Nano-bioencapsulation and p3407, Figure 1). Sol-gel bioencapsulation appears generic and a remarkably diverse range of enzymes, noncatalytic proteins, DNA, RNA, organelles, and living cells have been successfully encapsulated in their viable state (p3416, right column, The Future for Sol-Gel Bioencapsulation). Biomolecules encapsulated in sol-gel polymers are protected from biological degradation and are often considerably stabilized to chemical thermal inactivation (p3416, right column, The Future for Sol-Gel Bioencapsulation).

However, Gill fails to teach a method, wherein the biomolecular structure is a liposome-assembly comprising a membrane-associated molecule.

Gill et al. teaches that poly(glycerol silicate) (PGS, organic polyol silane) is a protein- and membrane-compatible sol-gel precursor as efficient confinement of proteins and cells is achieved using PGS (Abstract).

Stowell et al. teaches a method of immobilizing membrane-associated molecules in silica matrixes comprising combining a liposome-assembly, which includes the membrane associated molecule (column 3, lines 59-64), with a protein- and membrane-compatible sol-gel precursor under conditions to allow a gel to form (column 3, lines 18-30). Lipid membranes and vesicles (liposomes) mimic the biological cell structure (column 1, lines 25-26). Due to its self-assembled uniform structure and resultant physicochemical properties, they have gained more research attention and application in a variety of fields (column 1, lines 26-28). However, lipid membranes and vesicles are fragile metastable systems (column 1, lines 28-29). The compositions of Stowell et al. are expected to have enhanced thermal and mechanical stability compared to conventional phospholipid vesicles and phospholipid lipid bilayer membranes (column 2, lines 49-52). Moreover, these compositions find application in ion specific filtration anddesalination, and as detections biosensors, biocatalysts, high performance materials, optical, and diagnostic devices.

Kondo et al. teaches that silane coupling agent (in the absence of water, which would read on the conditions to avoid hydrolysis and polycondensation of the

precursor) or its hydrolysis product or hydrolysis condensation product can function as a coupling (linking) agent (see entire document, particularly (column 2, lines 32-34).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to employ a liposome-assembly of Stowell et al. comprising membrane associated molecule in the method of Gill in order to immobilize membrane-associated molecules in silica matrixes. The advantage of using thermally and mechanically stable liposome-assembly of Stowell et al. for application in ion specific filtration and desalination, and as detections biosensors, biocatalysts, high performance materials, optical and diagnostic devices provides the motivation to combine the teachings of Gill and Stowell et al. with a reasonable expectation of success as Gill et al. teaches that PGS is compatible with protein and membrane in an encapsulation process. With respect to the limitation of "sol-gel precursor is an organic polyol silane that is prepared under conditions to avoid hydrolysis and polycondensation of the precursor"

With respect to claims 7 and 8, Gill teaches that entrapped photoactive proteins such as bacteriorhodopsin can be used in solid state optical devices and transducers (p3415, right column, lines 4-6). Gill further discloses a method of immobilizing membrane-associated molecule such as bacteriorhodopsin in silica matrix (p3415, Table 4). However, Gill teaches a method of encapsulation of bacteriorhodopsin using trimethoxysilane (TMOS), which is not an organic polyol silane precursor. Although Gill fails to specifically teach a method to encapsulate

bacteriorhodopsin with an organic polyol silane, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the method of immobilizing membrane-associated molecule using organic polyol silane precursor as taught by Gill with a bacteriorhodopsin as a membrane-associated molecule in order to use the photoactive protein such as bacteriorhodopsin as an optical device and transducer.

With respect to claim 11, Gill teaches a method comprising the steps of (p3406 and 3408):

(i) combining an aqueous solution of the protein and membrane-compatible, sol gel precursor with an aqueous solution of.a liposome assembly comprising the membrane-associated molecule;

(ii) adjusting the pH of the combination of (i) so that it is in the range of about 4-11.5;

(iii) shaping the combination into a desired shape;

(iv)allowing the combination to gel;

(v) aging and partially drying the gel.

With respect to claim 14, Gill teaches a method of combining the biological structures and sol-gel precursor are combined in the presence of an indicator molecule and/or in the presence of one or more ligands for the biological structures (p3415, column 1, lines 1-5).

With respect to claims 15-19, Gill teaches a method of combining the biological structures and sol-gel precursor in the presence of one or more additives such as polyethylene glycol (p3407, Figure 1).

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gill (Chem. Mater., Web Release Date of July 4, 2001, Vol. 13, pp3404-3421) in view of Gill et al. (J. Am. Chem. Soc., 1998, Vol. 120, pp8587-8598) and Stowell et al. (U.S. Patent No. 6,284,163, Sep. 4, 2001) as applied to claim 9 above, and further in view of Madden(U.S. Patent No. 4,963,297, Oct. 16, 1990).

Gill in view of Gill et al. and Stowell et al. teaches a method of immobilizing membrane-associated molecules in silica matrixes as discussed above. However, Gill in view of Gill et al. and Stowell et al. fails to teach the use of lipid comprising 1,2-dioleoyl-sn-glycero-3-phosphocholine (DOPC)in liposome assembly.

Madden teaches a method of forming a vesicles (liposome assembly) without harsh treatments (column 2, lines 63-68). Method of Madden employs a variety of amphiphiles including DOPC (columns 7 and 8, Example 6). Further, the characteristic bilayer instability of the systems would be expected to enhance insertion of membrane proteins or peptides (column 3, lines 1-11).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to employ a method of forming a liposome assembly using DOPC as taught by Madden in the method of Gill in view of Gill et al. and Stowell et al. in order to form liposome assembly without harsh treatments and enhance insertion of membrane proteins and peptides. The advantage of forming liposome

assembly without harsh treatments provides the motivation to combine the teachings of Gill in view of Gill et al. and Stowell et al. and Madden with a reasonable expectation of success as the method of Madden would enhance insertion of membrane proteins or peptides and the inserted proteins or peptides would not be exposed to harsh treatments that may affect bioactivity of the membrane proteins or peptides.

14. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gill (Chem. Mater., Web Release Date of July 4, 2001, Vol. 13, pp3404-3421) in view of Gill et al. (J. Am. Chem. Soc., 1998, Vol. 120, pp8587-8598) and Stowell et al. (U.S. Patent No. 6,284,163, Sep. 4, 2001) as applied to claims 1 and 11 above, and further in view Lapidot et al. (U.S. PG Pub. No. US 2002/0064541 A1, Filed Oct April 21,2000) and Smith et al. (J. Am. Chem. Soc., Published on Web Mar. 28, 2002, 'Vol. 124, pp4247-4252).

Gill et al. in view of Gill et al. and Stowell et al. teaches a method of immobilizing membrane-associated molecules in silica matrixes as discussed above. However, Gill in view of Gill et al. and Stowell et al. fails to teach the use of aqueous buffer, comprising about 5% to about 50% (v/v) of glycerol.

Lapidot et al. teaches that the disintegration of microcapsules prepared by sol-gel process is effected by drying (p9, paragraph [0154]). The drying of the microcapsules is effected by the evaporation of water, which leaves the microcapsules exposed to the environment and thus triggers their disintegration (p9, paragraph [0155]). Additives that are capable of maintaining humidity and moisture

can be added during the sol-gel process to control the surface nature of the sol-gel matrix (p9, paragraph [0156]). Examples of humectants include glycerol (pl0, paragraph [0174]).

Smith et al. teaches a method of encapsulating an enzyme using a sol-gel technique (Abstract). During a gelation process, phosphate buffer comprising 10% glycerol was used during the wash step in order to remove the ethanol produced in the gelation reaction and during the aging and drying steps (p4249, left column, Casting of Sol-Gel Monoliths).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the method of Gill in view of Gill et al. and Stowell et al. with a use of humectant such as glycerol in a buffer solution as taught by Smith et al. to use during the drying process as taught by Lapidot et al. in order to control the surface nature of the sol-gel matrix and remove ethanol produced during gelation reaction and during the aging and drying steps with a reasonable expectation of success.

15. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gill (Chem. Mater., Web Release Date of July 4, 2001, Vol. 13, pp3404-3421) in view of Gill et al. (J. Am. Chem. Soc., 1998, Vol. 120, pp8587-8598) and Stowell et al. (U.S. Patent No. 6,284,163, Sep. 4, 2001) as applied to claims 1 and 15-19 above, and further in view Keeling,Tucker et al. (Chem. Mater., Published on Web July 31,2001, Vol. 13, pp3331-3350).

Gill in view of Gill et al. and Stowell et al. teaches a method of immobilizing membrane-associated molecules in silica matrixes as discussed above. However, Gill in view of Gill et al. and Stowell et al. fails to teach the use of polyethylene oxide (PEO), PEO-NH2, and poly NIPAM.

Keeling-Tucker et al. teaches a method of incorporating hydrophilic polymers within silicate materials with the silica sol (p3339, Hydrophilic Polymers, column 1, lines 1-5). The development of Class I materials generally involves the dispersion of hydrophobic, hydrophilic, or charged polymers or surfactants into sol-gel precursor materials during the hydrolysis step (p3338, B. Materials with Dispersed Organic Additives (Class I Materials), column 2, lines 2-6). Such materials can either interact with silica, thus modifying the properties of the solvent-silica interface, or can segregate into independent phases, resulting in unique structures such as interpenetrating polymer networks (p3338, B. Materials with Dispersed Organic Additives (Class I Materials), column 2, lines 6-11). The additive, PEO, was able to organize by hydrophobic interactions to provide a relatively large volume fraction of the organic subphase (p3340, column 2, paragraph 4, line 11-p3341, column 1, paragraph 1, line 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the method of Gill in view of Gill et al. and Stowell et al. with the use of an additive, PEO, in order to provide segregation into independent phases prior to gelation.

16. Claims 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gill (Chem. Mater., Web Release Date of July 4, 2001, Vol. 13, pp3404-3421)in view of Gill et al. (J. Am. Chem. Soc., 1998, Vol. 120, pp8587-8598) and Stowell et al. (U.S. Patent No. 6,284,163, Sep. 4, 2001) as applied to claims 1 and 15-19 above, and further in view of Leung et al. (Patent No. 6,204,202, Filed Apr. 14, 1999).

Gill in view of Gill et al. and Stowell et al. teaches a method of immobilizing membrane-associated molecules in silica matrixes as discussed above. However, Gill in view of Gill et al. and Stowell et al. fails to teach the use of polyethylene oxide (PEO), PEO-NH2, and poly NIPAM.

Leung et al. teaches a method for making silica nanoporous films (such as sol-gel) of sufficient mechanical strength that are also optimized to have a desirably low and stable dielectric constant, without the need for further processing to make the film hydrophobic (column 3, lines 19-26) by mixing a non-volatile thermally degradable polymer with an organic and/or inorganic silicon-based material (column2, lines 44-58 and column 3, lines 34-36). A useful nanoporous material must meet a number of criteria, including having a dielectric constant falling within the required value range, having a suitable thickness, having an ability of effectively fill gaps, and having an effective degree of hydrophobicity (column 2, lines 60-66). If the material is not strong enough, despite achieving the other requirements, the pore structure may collapse, resulting in high material density, and therefore an undesirably high dielectric constant.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the method of Gill in view of Gill et al. and Stowell et al. with an additive (thermally degrading polymer such as PEO having a molecular weight ranging from about 200 to 2,000,000 Daltons, column 4, lines 16-22).as taught by Leung et al. in order to make silica nanoporous films (such as sol-gel) of sufficient mechanical strength that are also optimized to have a desirably low and stable dielectric constant, without the need for further processing to make the film hydrophobic with a reasonable expectation of success.

17. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gill (Chem. Mater., Web Release Date of July 4, 2001, Vol. 13, pp3404-3421) in view of Gill et al. (J. Am. Chem. Soc., 1998, Vol. 120, pp8587-8598) and Stowell et al. (U.S. Patent No. 6,284,163, Sep. 4, 2001) as applied to claims 1, 15, and 16 above, and further in view Delamarche et al. (Langmuir, Published on Web Sept. 11, 2003, Vol. 19, 8749-8758).

Gill in view of Gill et al. and Stowell et al. teaches a method of immobilizing membrane-associated molecules in silica matrixes as discussed above. However, Gill in view of Gill et al. and Stowell et al. fails to teach the use of an additive selected from compounds of Formula 5.

Delamarche et al. teaches theuse of PEO silane onto a sol-gel polymer, poly(dimethylsiloxane) ink, resulting in a stable hydrophilic structure (p8755, 3. Conclusion, column 2, lines 1-6). The method of using PEO silane is simple and

particularly effective when proteins are active molecules (p8755, 3. Conclusion, column 2, line 4-p8756, column 1, line 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the method of Gill in view of Gill et al. and Stowell et al. with an additive of Formula 5 (p8751, Scheme 1, Formula 17) as taught by Delamarche et al. in order to provide a simple and effective means to construct a stable hydrophilic structure. The advantage of having a silica matrix, which is stable and hydrophilic, provides the motivation for combining the teachings of Gill in view of Gill et al. and Stowell et al. with a reasonable expectation of success.

Claims 16, 24 and 25 are not supported by the disclosure in parent application (10/712,015). Therefore, the priority date of the parent application is not applicable for the claims 16, 24, and 25 and the above reference, Delamarche et al. meets the criteria for a prior art.

Response to Argument

18. Applicant's amendments and arguments filed 8/27/07 have been fully considered but applicants arguments are rendered moot in view of new grounds of rejection as described in the office action necessitated by Applicant's amendments.

Conclusion

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shafiqul Haq whose telephone number is 571-272-6103. The examiner can normally be reached on 7:30AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long V. Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SHAFIQUL HAQ
EXAMINER
ART UNIT 1641

LONG V. LE 12/26/07
SUPERVISORY PATENT EXAMINER
ART UNIT 1641